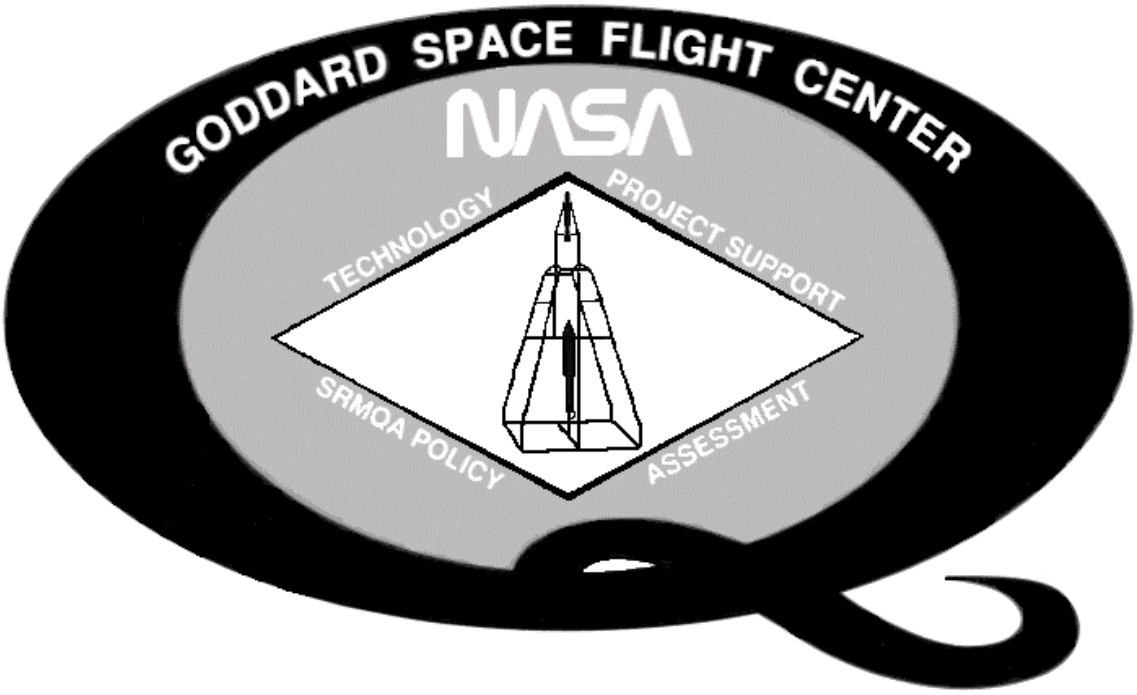
Office of Systems Safety and Mission Assurance

Goddard Space Flight Center

Annual Operating Agreement for Fiscal Year 1998



September 30, 1997

Office of Systems Safety and Mission Assurance
Code 300
Goddard Space Flight Center

FY 98 Annual Operating Agreement

Concurrence:

_____ _____

Charles S. Vanek — Date
Director of the Office of Systems Safety and Mission Assurance
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Joseph H. Rothenberg — Date
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Frederick D. Gregory — Date
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NASA Headquarters

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1.0 INTRODUCTION

1.1 The Annual Operating Agreement

This Annual Operating Agreement (AOA) describes the implementation of the systems safety and mission assurance function, by the Office of Systems Safety and Mission Assurance (OSSMA), at the Goddard Space Flight Center. The plan documents the activities, methodology, and resources required to meet the needs of the OSSMA customers, in the areas of mission assurance, safety, and reliability. It reflects linkage to the objectives of NASA Code Q, and the NASA Enterprises, Space Science (Code S), and Mission to Planet Earth (Code Y). It was prepared in response to a NASA Headquarters requirement for an annual operating plan that addresses the elements of the NASA Code Q Integrated SMA Management Model.

1.2 AOA Purpose

This plan will be used to manage the OSSMA in FY 98. Key processes that are utilized in customer support activities are described in Appendix A, with metrics that will be used to measure successful performance. The consequences for non-delivery of OSSMA products and services are defined within the processes as the “Risk of Not Doing”. Resources required to provide projected OSSMA services and products to GSFC projects are defined in Appendix C, and are based on workload forecasts and negotiated customer requests for support.

The expected benefits of the AOA process are; better identification of customer requirements, increased focus of the organization on common goals, and greater definition of the OSSMA responsibilities. It is further expected that there will be improvements in customer satisfaction as features described in the AOA plan are implemented in FY 98.

The recent GSFC reorganization has resulted in the transfer of most of the Assurance Technologies Division (ATD), out of the OSSMA. Moving to the newly established Applied Engineering and Technology Directorate (AETD) are the following groups within the ATD; the Parts Branch, the Electronic Packaging and Processes Branch, and the Materials Engineering Branch. These groups will now provide expertise and services to the OSSMA as their customer. The one ATD group remaining in the OSSMA will be the Eastern Region Training Center, which will be administered by the Assurance Management Office.

1.3 Method / Approach

The AOA is expected to be a multi-year development effort that builds upon results, procedural development, and organizational growth. The OSSMA is currently identifying changes in processes, adding new processes, aligning activities within the GSFC framework, and implementing strategies that will lead to further compliance with the Code Q Strategic Plan and supported Enterprise Safety and Mission Assurance (S&MA) Agreements.

This agreement is designed to be a top-level working document. It was developed through assessment of internal operations, describing processes and metrics that enable

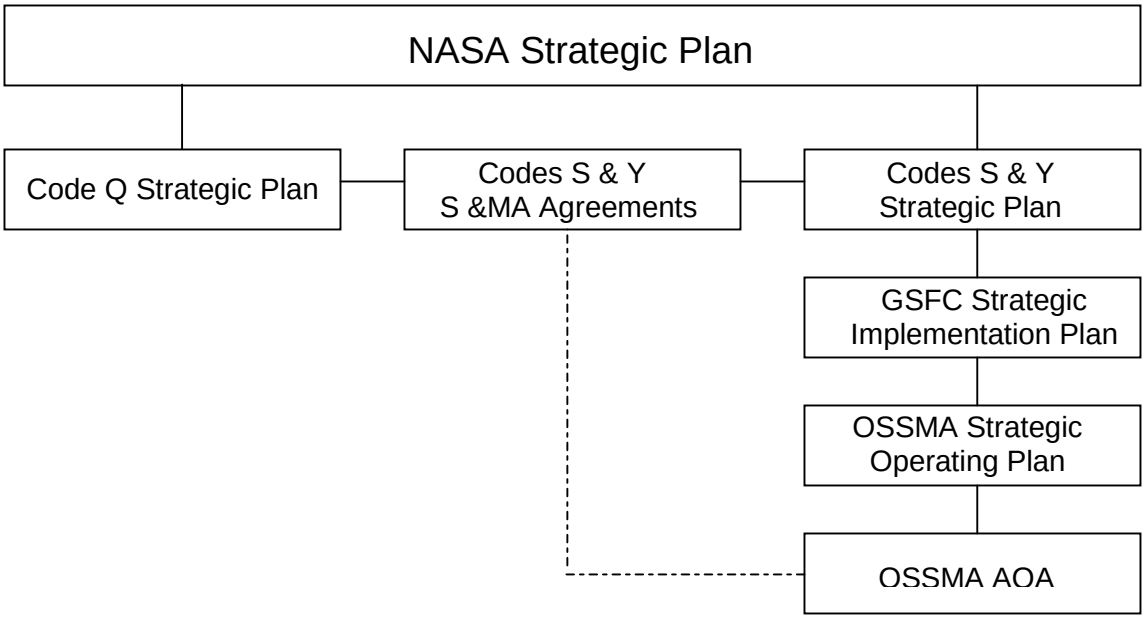
optimization of performance, and self-evaluation as an integral part of the management process. "Top-level" metrics, for the OSSMA and its' office level processes, are included in this AOA. Office level activities will be managed from operational manuals, similarly containing processes and associated metrics. They will also contain office mission statements, goals, resources, and any other management tools used by the office chiefs.

Also described, are strategies to comply with Agency thrust to redefine the way in which the OSSMA will operate. A conscious effort will be made to take advantage of the benefits provided by ISO 9001 registration of suppliers and Performance Based Contracting. Compliance with the intent of the Government Performance and Results Act (GPRA) is demonstrated through the use of process documentation and metrics used to gauge performance.

In response to Code Q Safety and Mission Assurance Agreements with Codes Y and S, this AOA reflects new approaches in customer service methodology. As safety and mission assurance implementation evolves, it is moving away from being rules driven and toward being responsive to each individual situation and circumstance. Customer needs are integral to the formation of S&MA support plans, and take into account parameters such as mission size, available resources, and acceptable risk levels. Support levels exist in a wide range in response to customer needs. The fundamental approach for OSSMA operations at GSFC is to closely match mission needs with S & MA services, to define processes that effectively meet customer requirements, and to deliver services in an increasingly efficient manner.

1.4 Linkages to NASA Strategic Plan and GSFC Strategic Implementation Plan

The diagram below illustrates linkages between this document and the higher level strategic plans that it supports.



2.0 SYSTEMS SAFETY AND MISSION ASSURANCE ROLE

2.1 On-Going Efforts

The OSSMA is presently responsible for supporting system safety and mission assurance over the entire program life cycle for all GSFC space flight and space flight support missions. The OSSMA works to policy guidelines set by NASA Headquarters, Code Q, for the implementation of quality assurance, reliability, and system safety, and to programmatic guidelines set by the NASA Enterprises and the Center Director. As support team members to the Projects, the OSSMA provides expertise and other resources to fulfill Enterprise mission objectives. Expert technical support is provided in the areas of product hardware assurance, software assurance, environmental test verification, reliability, flight-system safety, and technical design reviews.

As a separate function, the OSSMA implements an independent technical system design review effort for the Center Director. Independent assessments of mission designs and strategies at the system level are conducted to ensure the highest certainty of mission success. These formal system level reviews are tailored to each project, and complement detailed peer level technical reviews.

The OSSMA helps projects to implement mandated system safety requirements and provides certification of compliance. The Office maintains an expertise in interpreting safety requirements imposed by government regulation, Agency policy, OSHA, and the launch ranges. This expertise is provided to OSSMA customers in the achievement of full safety compliance in all mission aspects. Depending on the specific needs of a customer, OSSMA involvement ranges from the provision of basic guidance, to the actual generation of safety documentation. The OSSMA also provides the necessary certification of compliance with safety requirements for all GSFC space flight and space-flight support missions as required by the Center Director and the Director of OSMA at NASA Headquarters.

The OSSMA has also been assigned responsibility for the management of the GSFC quest for ISO 9001 registration. The Associate Director of the OSSMA leads this effort as a full-time duty, which is described more fully in Appendix A.

2.2 New Roles and Functions

In an effort to better support the Center, the OSSMA is expanding old services and developing new services that are expected to be beneficial to its' customers.

2.2.1 Mission Assurance Support to Operational Projects

Presently, the OSSMA project support activities are being provided primarily to missions with significant hardware or software development, and does not typically extend into the post-developmental stages. In response to a need, and with the support of Center management, the OSSMA is expanding customer support activities into the operational phases of GSFC missions. This involvement will provide better feedback on quality and design issues that is expected to improve the reliability of current operations as well as the implementation of future missions. It will provide an independent assessment of mission operations and will provide for timely and comprehensive inputs into the Spacecraft On-Orbit Anomaly Reporting Database.

2.2.2 Anomaly Review Function

In a further commitment to improving the implementation of the GSFC mission, the OSSMA plans to establish an anomaly review function. This will provide for a coordinated approach to the analysis of information regarding operational and performance anomalies, and dissemination of resulting information across the Agency and into the planning of future missions.

2.2.3 Support to Risk Management

The OSSMA is developing a new customer support service in recognition of the need within the Agency and the GSFC projects to do more proactive risk assessment and management. Expert support capability is being developed to aid projects in the assessment of risk and the implementation of risk management. The goal is to provide a service whereby a formalized methodology is followed in the identification, evaluation, and mitigation of risk elements. OSSMA experts will participate in the development and implementation of strategies, and provide the latest risk management tools to GSFC projects.

2.2.4 Senior Advisory Office

Some of the new functions described above will be implemented with the aid of a new office within in the OSSMA. Highly experienced GSFC project and systems management personnel who become available as their projects are concluded will staff this office mostly on a rotating one to two year term basis. These individuals will perform the new functions of anomaly review and support to risk management, and provide additional expertise into the technical system review effort. Bringing these skilled and experienced personnel into the OSSMA will result in a higher level of service to its customers, enhancing its stature within the Center, which will ultimately benefit the implementation of systems safety and mission assurance at GSFC.

The OSSMA seeks to provide the greatest benefit to its customers. Proactive involvement as team members with our customers is fundamental to achieving this objective. OSSMA processes are being retailored to ensure meeting program guidelines and requirements and to provide customer satisfaction by being viewed as value-added. This approach requires continuous feedback on customer needs and OSSMA performance in response to those needs, and close monitoring of customer metrics.

3.0 OSSMA ORGANIZATION

The OSSMA is currently comprised of the support staff and three Offices that provide the services and products related to Systems Safety and Mission Assurance at GSFC. They are described as follows:

3.1 The OSSMA Staff (Code 300)

The OSSMA staff provides administrative management and support to the three OSSMA Offices. Information systems and resource management activities are included in this

role. Certain S&MA and Center management related tasks are performed directly by the OSSMA staff. For example, under the Associate Center Director, the OSSMA Associate Director is responsible for management of the GSFC program to become ISO 9001 registered, as mandated by NASA Headquarters. This program is described later in the AOA in the ISO 9001 process description, which includes a schedule for completion. Additionally the Director of the OSSMA is a member of the GSFC Program Management Council (PMC) that helps manage GSFC programs. Detail relative to these areas appears in the OSSMA Operations Manual. Development and maintenance of S&MA related databases, providing support to GSFC projects, to other NASA Centers and other Government Agencies through on-line systems is also managed by the OSSMA. These databases are described below.

- **SOARS** - *Spacecraft Orbiting Anomaly Reporting System,*
  Provides a historical summary of orbital anomalies observed on GSFC spacecraft. This database is being linked with a similar effort at the Aerospace Corporation to provide a greater amount of information to users.

- **P/FR** - *Problem Failure Reporting*
  Provides real-time access to S&MA related problem status on current GSFC projects.

- **WAS** - *Work Authorization System*
  This is an internal system for work authorization and status tracking and serves the Center project management effort.

- **FARS** - *Flight Assurance Review System*
  Repository and tracking system for reviews conducted by the OSSMA Systems Review Office.

- **PROCON** – *Programmatic Concerns System*
  Used internally by the Systems Assurance Managers to document, update and track risk bearing programmatic elements.

3.2 The Systems Review Office (Code 301)

The Systems Review Office (SRO) supports GSFC and agency-wide programs by conducting independent assessments of mission technical designs and concepts. Potential or actual problems associated with mission technical designs are identified in a timely fashion in order to minimize program cost and schedule impacts. This is accomplished through technical system design reviews conducted at critical points in the program life cycle. These reviews provide a system level culmination of the technical peer review process and assure that no omissions or major flaws exist in the system design of GSFC projects.

The SRO supports projects through the establishment of a Technical Design Review Plan (TDRP). The implementation strategy of the TDRP varies according to the type of program, and is defined by guidelines provided by the NASA Enterprises and by the Center Director. The TDRP is developed jointly by the Project and the SRO. As a part of the System Safety and Mission Assurance Plan, it is approved by the Center Director. Once the plan is approved, the SRO, through the Director of the OSSMA, is responsible to the Center Director for implementation of the technical design review process. The SRO then works with the project manager to provide for a timely, efficient, and systematic implementation of the approved technical design reviews.

The objective of this technical design review process is to optimize the probability of success of GSFC-managed space flight and space flight support missions by providing for an independent assessment of program technical viability and progress throughout the program lifecycle. The technical design review process is focused on building in quality and eliminating problems early in design and conceptualization. These reviews focus on system level issues as well, addressing the adequacy and completeness of detailed peer level technical reviews. SRO personnel bring together independent technical experts from other organizations, in many technical disciplines, to identify and resolve technical and conceptual issues that can affect mission success.

3.3 Systems Safety and Reliability Office (Code 302)

The Systems Safety and Reliability Office (SS&RO) supports NASA Headquarters, the NASA Enterprises and the Center Director in the interpretation of Agency policy and Government regulations on system safety as they apply to GSFC space flight and space-flight support missions. The SS&RO works with these missions from the earliest conceptual phase to identify system safety issues and thereby minimize the implementation impacts upon these programs. This office then provides the necessary level of support throughout the lifecycle of these programs to ensure the most efficient implementation of the required system safety. The SS&RO, through the Director of OSSMA, also provides the necessary certification of system safety compliance by these missions to the Center Director.

The SS&RO also supports these missions in their implementation of reliability engineering, risk management and environmental testing by providing expertise and other resources as needed. Early reliability calculations and assessments are done in order to be able to influence the mission design and implementation in the most efficient manner. A project risk assessment is performed and a risk management plan is developed and maintained for the project manager using the expertise of the OSSMA.

The objectives of the SS&RO are to provide for the most efficient implementation of system safety and optimum risk management for managers on all GSFC space flight and space flight support programs.

3.4 Assurance Management Office (Code 303)

The Assurance Management Office provides expertise to the GSFC space flight and space flight support programs in the implementation of mission assurance. This expertise is funneled through a single point of contact, the Systems Assurance Manager (SAM) who functions as a member of the project management team. This method of customer interface helps the project manager to establish, coordinate, and manage the implementation of both the assurance program and the system safety program. Generally the SAM is co-located with the project office, to provide the most efficient access to the project manager and his staff. The AMO also provides additional resources in the form of Quality Engineers and Quality Assurance Specialists under the purview of the SAM. The SAM works with the project to provide additional resources for acquiring and managing other elements such as materials and parts support, process verification, reliability, safety, quality and software assurance, environmental test verification, and the performance of technical system design reviews.

At the beginning of a new project, the SAM assists in the establishment of a System Safety Mission Assurance Plan (SSMAP). This plan is developed from general OSSMA Mission Assurance Guidelines, which are tailored to specific project needs and programmatic requirements. The team produced SSMAP reflects specific project requirements, such as hardware criticality and characteristics, mission objectives, and acceptable levels of risk, as well as Agency, Enterprise, Center, and Government policy and regulations. The plan covers system safety implementation, all aspects of mission assurance, and the Technical Design Review Plan. The SSMAP is approved by the Center Director in the initial stages of each project.

The SAM then actively participates in all phases of the developing program. Throughout the concept formulation, RFP preparation, and Source Evaluation Board activities, the SAM works as a key member of the mission team in the development of project S&MA requirements and participates in the proposal evaluation process. Following contract award, the SAM is a key senior member of the project manager's team and is responsible to both the project manager and the Director of OSSMA to assure that all S&MA requirements, as specified in the project SSMAP, are properly implemented.

The SAM develops civil service manpower requirements for all OSSMA support personnel. As an interface between the Project Manager and the GSFC Directorates, the SAM aids in the acquisition of OSSMA support contractor resources.

The SAM is responsible for the quality assurance program, and delegates, with the project manager's concurrence, quality assurance functions to supporting Government Agencies such as the DCMC, NAVPRO, and ONR. The delegations cite well-defined assurance requirements tailored to the individual project requirements. (Appendix D of this AOA provides details of the planned GSFC Quality Assurance delegated support for FY98 and FY99) When appropriate, the SAM recommends to the project manager the establishment of field office operations at contractors' plants, in order to provide the necessary insight/oversight support to the project.

The occurrence of any type of failure prompts the SAM to begin the process of problem management and resolution. Coordinating with contractors, suppliers, and other project personnel, the SAM collects pertinent information to determine the extent of the problem. The SAM then supports the project by identifying the actions necessary to correct and preclude reoccurrence of the problem. This may include guidance in the areas of design, manufacturing, testing, or documentation.

To record failure details, status, and corrective action taken, the SAM establishes a system for tracking and reporting failure occurrences. Status of active issues is provided on a monthly basis for risk assessment and management.

The SAM serves as the primary project interface with the Systems Review Office and works to assure that the implementation of the project technical design review program is in compliance with the approved Technical Design Review Plan. Representing the project, the SAM will be the primary source of technical information to the Systems Review Office on S&MA issues concerning the use of specific parts, materials and processes, packaging, and the characterization of radiation effects.

The SAM has overall responsibility for ensuring that the generation and implementation of the project system safety requirements is in accordance with applicable NASA/GSFC, launch site, and project requirements and regulations.

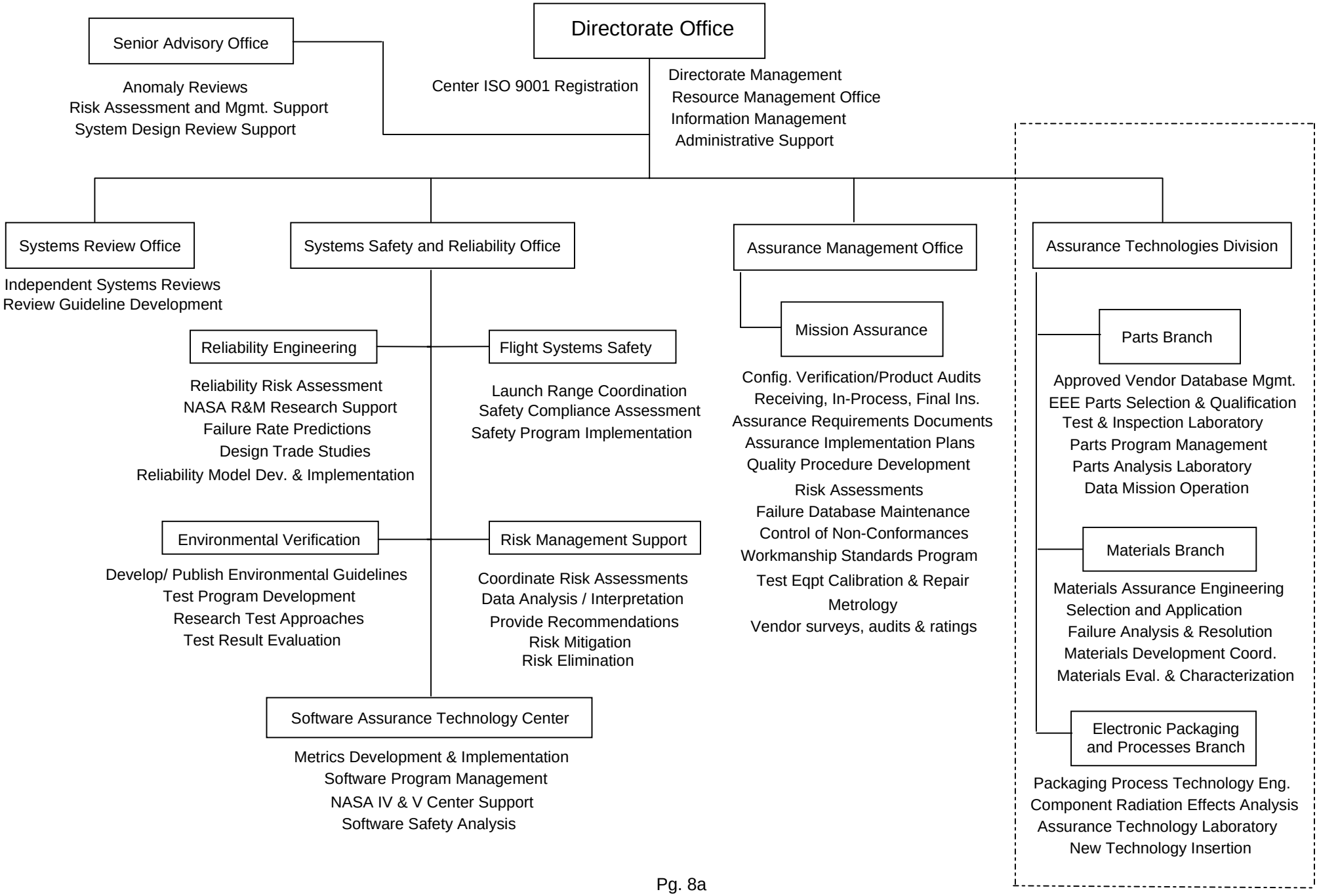
3.5 OSSMA Goals

- Provide a complete set of S&MA related products and services to project and Center customers.
- Provide the best possible S&MA expertise to all customers.
- Assure that the appropriate level of S&MA implementation is planned from the start into each new program.
- Maintain a value-added S&MA involvement during all phases of GSFC programs.
- Provide an independent assessment role for the Center Director in order to maximize the probability of success for Center missions.
- Provide leadership in S&MA technology and policy development for the Center and the Agency.

3.6 OSSMA Strategies

- Work as team members with projects to develop optimum project specific system safety and mission assurance programs.
- Through metrics and self-evaluation continually adjust OSSMA methodologies to provide value-added support to the projects, the Center and the Agency.
- Implement a proactive approach to S&MA implementation.

OSSMA Functional Organization Chart



OSSMA Functions (Circa 1997)

Typical Life Cycle Phases

Support Activity	Develop		Implementation			
	1. Program Concept	2. Development	3. Production	4. Test	5. Certification	6. Operational
REVIEWS (Typical)	▲ Scientific Mission Proposal ▲ Design Reviews	▲ Preliminary Design Review (PDR) ▲ Critical Design Review (CDR)	▲ Configuration Control Board (CCB) Reviews	▲ Pre-environmental Review (PER)	▲ Pre-shipment Review (PSR) ▲ Flight Readiness Review (FRR) ▲ Launch Readiness Review (LRR) ▲ Operational Readiness Review (ORR)	▲ Anomaly Review (If Required)
System Review Office	▲ Review Guideline Development ▲ Independent Systems Reviews	←		▲ Design Verification & Validation & Validation of PEER Reviews	→	
System Safety & Reliability Office	**Reliability Engineering** ▲ NASA R&M Research Support ▲ Reliability Model Development & Implementation ▲ Failure Rate Predictions ▲ Design Trade Studies ▲ FMEA ▲ Design Review ▲ Alerts ▲ Modeling ▲ GIDEP Alert System			**Flight System Safety** ▲ Launch Range Coordination ▲ Safety Compliance Assessment ▲ Safety Program Implementation ▲ Design Review ▲ Failure Review Boards **Risk Management** ▲ Coordinate Risk Assessments - Data Analysis / Interpretation ▲ Provide Recommendations – Risk Mitigation & Risk Elimination ▲ Affordability	
Assurance Management Office	**Mission Assurance** ▲ Configuration Verification / Product Audits ▲ Receiving, In-Process, Final Inspection ▲ Assurance Requirements Documents ▲ Assurance implementation Plans ▲ Quality Procedure Development ▲ Risk Assessment ▲ Failure Database Maintenance ▲ Control of Non-Conformances ▲ Workmanship Standards Program ▲ Training / Certification ▲ Quality Planning Requirements ▲ Design Reviews ▲ Quarterly Status			▲ Process Planning, Qualification, Implementation & Assessment ▲ Calibration & Metrology ▲ MRB / CCB / CAB / FRB ▲ Packaging, Marking & Transportation ▲ Quality Records Control ▲ Quality Policy & Procedures **Procurement Assurance** ▲ Vendor surveys ▲ Purchasing Requirements ▲ Corrective Action ▲ Production Procedures ▲ Supplier Evaluation System ▲ Contractor Metrics Reviews	
Senior Advisory Office	▲ Support to System Design Reviews ▲ Risk Assessment and Management Support	→				▲ Anomaly Investigative System

Quality Planning Requirements/Guidelines & Objectives

Requirements/Guidelines (http//nodis.hq.nasa.gov)	Requirements/Guidelines (http//nodis.hq.nasa.gov)	Objectives
• NHB 5300.4 • NMI • NPD • NPG • GMI • NHB 7120.5	• MAG-1 • NAS • MIL-STANDARDS • SPAR III • GEVS-SE • ANSI/ASQ 9001	• Defining GSFC SR&QA Requirements • Ensure Compliance to GSFC Policies • Maintain GSFC Quality Procedures, Plans and Policies • Assure hardware/software quality levels • Promote mission success

LEGEND :

▲ - **Time phased Activity**

● - **Requirements/Guidelines & Objectives**

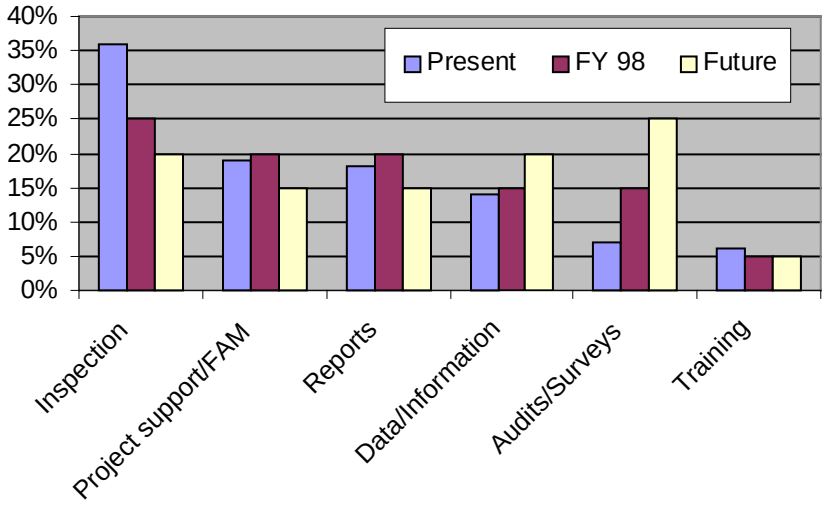
4.0 OSSMA PROCESSES

The Functional Organizational Chart below (Chart 1, pg. 8a.) displays the upper level processes across the OSSMA by Offices and Divisions where they reside. The dashed-line box surrounding the Assurance Technologies Division shows those activities which are being relocated to the Applied Engineering and Technology Directorate as part of the GSFC reorganization. A second chart displaying key processes in a time-phased relationship to the project is included as pg. 8b.

To better meet customer needs, the evolution of processes is considered in the management of OSSMA operations. An evolving process is the management of S&MA activities in the Principal Investigator (PI) mode of operation. This gives the PI full responsibility for planning, designing, and implementing his program from start to finish with varied involvement by the Center S&MA organization.

The chart below portrays the projected impact on employee time allocation as the OSSMA processes are readjusted to meet the needs of future customers. Significant influencing factors include a greater emphasis on smaller programs, and the Principal Investigator mode of program implementation. Present statistics reflect current actual time allocations. Future activities are based on the work forecast of new mode missions.

Employee Time Utilization Analysis



Inspection - The implementation of Performance Based Contracting and project surveillance plans that emphasize insight instead of oversight will reduce the time spent on widespread government source inspections.

Project Support - Small near-term increase expected through maturation of current projects, which utilize "dedicated support". Shift to "shared" and "as-needed" support reflects greater acknowledgement of contractor S&MA capabilities reducing overall demand for hands-on support in the future.

Reports - (same explanation as Project Support)

Data / Information - Greater implementation of computerization will demand more time and resources until systems are at a mature state. The introduction of an ISO-based GSFC quality management system will require the establishment and maintenance of several new databases to track center-wide data for process analysis.

Audits/Surveys - Greater use of COTS hardware and software will result in higher levels of vendor audits and surveys. ISO 9001 implementation will demand greater time in internal auditing activities.

Training - New computer-based training and NASA's PDI will provide more and greater opportunities for learning, with easy access that enables users to make better use of training time.

Although not reflected in this time allocation chart, the overall S&MA effort is expected to become more efficient, providing more support activity, with less dedicated manpower.

OSSMA activity descriptions are provided in Appendix A, detailing products, performance metrics, customer identification, and "Risk of Not Doing" in a standard format. Documentation relative to lower level activities, not included within the AOA, appear in Office Operations Manuals, which are currently in various stages of completion. These manuals will provide detailed descriptions of support to GSFC missions, and the processes that define implementation.

Metrics selected for use by the Director in managing OSSMA operations will be gathered for the most part within the Offices. The OSSMA staff will select specific metrics to monitor and demonstrate performance relative to customer satisfaction. Independent of scheduled periodic reviews, information system based metric status will be kept updated by the Offices so that it is available to the OSSMA staff for review at any time.

Throughout the OSSMA, at all levels of operation, real-time interface is an integral part of the teamwork approach to working with customers. In many cases this is accomplished by co-location of personnel who are active participants in project teams. This extensive communication relative to requirements and performance provides an excellent, if informal understanding of customer satisfaction. In a few cases where interaction is not as extensive, OSSMA personnel make it a point to contact customers directly to be sure that any questions or concerns receive the required attention.

The OSSMA supports the GSFC projects depending upon needs at various project phases. A current summary of expected project support requirements is included as Appendix C.

5.0 CODE Q FUNDED PROGRAMS

The OSSMA manages tasks funded by NASA Code Q, that are designed to further the ability to provide better products and services in support of space-flight research and technology usage activities. These efforts are initially proposed by Offices within the

OSSMA, based on understanding of mission goals and requirements. Code Q reviews these proposals and selects the ones that will provide the most benefit to existing and expected customer groups.

Submissions selected for funding by Code Q are developed and managed within the OSSMA. A financial spending plan is developed for each five digit UPN 323-XX program area for the duration of the program. The OSSMA Resources Management Office tracks expenditures versus plan. A quarterly presentation of status of each program is made to the Director of OSSMA, providing an opportunity to redirect resources within UPN programs, based on issues related to resource requirements, funding, or technical considerations. Significant project redirection, affecting scope of activity, is brought to the attention of NASA HQ for concurrence, if required. Results from completed programs are disseminated to users, sponsors, NASA HQ, and other centers, as applicable. A matrix of current UPN-323 tasks describing task objectives, funding profiles, responsible organizations within GSFC, and task owners is included as Appendix D.

6.0 OSSMA STAFFING

The total OSSMA staffing is shown in the table below, as civil service and contractor support to the various Offices. The data presents a snapshot of current staffing by discipline. This summary differs from Appendix B in that only Code 300 personnel are included below, while Appendix B includes personnel support from other GSFC Directorates and relates only to specific project work.

Category	**Total**		**Code 300**		**Code 301**		**Code 302**		**Code 303**	
	Civil Service / Contractor		**c.s./cont.**		**c.s./cont.**		**c.s./cont.**		**c.s./cont.**	
Management	9	12	5	6	1		1	2	2	4
Clerical	5.5	11	2.5	8	1		1	1	1	2
Facility Ops.	0	2		2						
Software Eng.	1	24		7			1	5		12
Software Tech.	0	3		2				1		
Metrology Engineer	1	1	1							1
Metrology Tech.	0	6								6
Quality Eng.	1	26						1		26
Quality Tech.	3	7							3	7
Safety Eng.	9	14					9	14		
Safety Tech.	0	1						1		
Reliability Eng.	3.5	5	1				2.5	5		
Workmanship Trainer	0	6								6
Systems Eng.	9	0			6		3			
SAMs	23	0							23	
Resource Mgr.	1	0	1							
Admin./RAs	3	0	3							
Mechanical Inspectors		5							5	
(Subtotals)	**69**	**123**	13.5	25	8	0	17.5	30	34	64
TOTAL (all personnel)	***192***									

Office of Systems Safety and Mission Assurance Staffing

Appendix A

Process Descriptions in Template Format

Office of Systems Safety and Mission Assurance
NASA Goddard Space Flight Center
Annual Operating Agreement Plan

Customer: GSFC Center Director

Activity Description: Independent Assessment of Technical Implementation

The OSSMA is responsible for conducting a continuous independent assessment of the technical implementation of GSFC missions to enhance the probability of their success. This activity has an informal component, whereby knowledgeable experts keep the OSSMA informed of project status and issues. It also has a more formal component involved with the technical design review process. The Systems Review Office is responsible for conducting an independent assessment of the status of GSFC missions through the technical review process. This effort begins at the initial phase of project or mission conception, and is conducted as a series of evaluations at specific stages of mission development. The level of activity is tailored to the programmatic needs of each individual mission and is carried out in accordance with the System Safety and Mission Assurance Plan approved by the Center Director. The scope of this effort varies from the conduct of system level technical reviews and an assessment of the lower level peer review process, to only providing an assessment of the Principal Investigator's implementation of an independent review process. This effort uses the support of personnel from other technical directorates at the GSFC.

Risk of Not Doing:
Elimination or reduction of the independent assessment would result in a reduced probability of mission success, based on risks associated with design, qualification, and operations. Center Management would be less cognizant of risks, issues, and safety associated with the missions.

Products or Services:	**Metrics:**
Single page summary to Center Director representative	Delivery within 5 days of review.
Review report	Delivery within 30 days.
Red Book (for non-P.I. mode missions.)	Delivery 3 weeks before launch date Customer survey feedback.

Projects/ Tasks:

- Non-Advocate Review
- Systems Concept Review
- Preliminary Design Review
- Critical Design Review
- Mission Operations Review
- Pre-Environmental Review
- Pre-Shipment Review
- Flight Operations Review
- Launch Readiness Review

Office of Systems Safety and Mission Assurance
NASA Goddard Space Flight Center
Annual Operating Agreement Plan

Customer: Project Manager

Activity Description: Systems Safety Assurance Support

The OSSMA supports GSFC flight projects by implementing system safety programs mandated by NASA, the U.S. Air Force, or internationally controlled launch ranges. The Systems Safety and Reliability Office (SS&RO), assigns a safety expert to each project to assist the launch range in determining the appropriate requirements to impose on the mission and to assist the project manager in understanding and achieving compliance with those requirements. The SS&RO offers various levels of support and service to the project manager based on the programmatic needs of the project. The systems safety program implementation is fully defined in the SS&RO handbook however, in all projects, the project manager is ultimately responsible for compliance with system safety requirements.

Risk of Not Doing:
Failure to implement an effective system safety program could prevent the on-time launch or deployment of hardware or software and add significant costs in retrofitting safety compliance.

Products or Services:	**Metrics:**
Safety Data Package Safety Data Package Review (externally produced.)	On-time delivery to project based on launch range need date. Achievement of range safety certification without need of substantial rework of safety data package. Review accomplished within one week.

Projects/ Tasks:	**Projects / Tasks, cont.**
Develop/assist In dev. mission specific safety rqmts. Develop or assist in developing safety data package, missile systems pre-launch safety package, accident Risk assessment report Review & analyze GSE & flight hardware designs/ tests/ analyses Perform systems failure / hazard analysis Perform / assist in developing ops. hazard analysis Develop / assist in developing hazard controls Develop ground ops. & launch site safety plan Develop project safety plan Assist in procedure dev. / procedure review I&T and launch site Assist in completion of radioactive material health forms: training histories, use permits Present safety status at milestone reviews Develop/assist in developing hazard control verification methods and tracking. Make presentations to NASA and DOD safety panels.	Develop, evaluate and present waivers Perform fault tree analysis Perform sneak circuit analysis Perform hazardous procedure tracking Coordination of launch / test site Monitor hazardous operations Chair / participate in safety working groups Participate in design / specification development to incorporate systems safety requirements. Perform independent safety assessment.

Office of Systems Safety and Mission Assurance
NASA Goddard Space Flight Center
Annual Operating Agreement Plan

Customer: GSFC Center Director

Activity Description: Independent Assessment of System Safety

The OSSMA evaluates Mission System Safety Program implementation on all GSFC projects. The Systems Safety and Reliability Office (SS&RO), reviews the efforts of the projects for overall compliance with the Launch Range requirements and other mission safety requirements. The SS&RO issues a memo to the Director of OSSMA confirming that all mission safety requirements have been met. Range acceptance of the safety data package is also required and is a further confirmation of compliance.

Risk of Not Doing:

Failure to provide an independent assessment of the system safety implementation increases the risk that mission safety will not be properly implemented. This could cause accidents, injury or loss of life and or mission objectives.

Products or Services:	**Metrics:**
Continuous assessment of process on system safety. Assessment memo / range acceptance memo	On-time delivery of written assessment (1 week before delivery of Red Book to Center Director)
Projects/ Tasks: Continuous assessment of the mission system safety implementation by project safety manager Overall assessment of the project safety program implementation by the Chief of the System Safety and Reliability Office	

Office of Systems Safety and Mission Assurance
NASA Goddard Space Flight Center
Annual Operating Agreement Plan

Customer: Project Manager

Activity Description: Risk Management Support

The OSSMA supports the flight projects in the development and implementation of a risk management program. Risk management begins at the pre-Phase A stage and continues through system deactivation. The Systems Safety and Reliability Office provides a variety of risk management services to the GSFC projects. This comprehensive risk management capability gives the projects the necessary skills needed to develop and implement a formal risk management program.

Risk of Not Doing:

If this activity is not performed, the implementation of risk management programs, as required by NPG 7120.5 on GSFC projects, will be more difficult and less efficient to implement

Products or Services:	**Metrics:**
Development of implementation plan.	Definition of risk management support program by 3/3/98.
Projects/ Tasks: Risk identification Risk assessment Resource identification Reliability analyses Risk management plan development Risk mitigation development Risk management tool acquisition and development	

Office of Systems Safety and Mission Assurance
NASA Goddard Space Flight Center
Annual Operating Agreement Plan

Customer: Project Manager

Activity Description: Mission Assurance Support

This activity provides the planning and implementation of a mission assurance program for the projects. Activity starts at the initial phase of each effort and is documented in the Systems Safety and Mission Assurance Plan. The process is facilitated by providing a single point of contact for project OSSMA activities, called the Systems Assurance Manager (formerly the Flight Assurance Manager). Mission assurance functional support, which this activity provides includes environmental verification, quality assurance, reliability engineering analyses, software management, workmanship audits and on-orbit anomaly reporting. This activity also provides coordination for the systems reviews, anomaly reviews, safety program implementation, and the parts, materials, and processes program.

Risk of Not Doing:

Failure to provide a mission assurance support program to a project would result in a lack of risk determination, assessment, and mitigation, necessary to assure a reliable product.

Products or Services:	**Metrics:**
Mission assurance plans Mission assurance requirements Surveillance of contractor or product Mission assurance expertise and consultation	SSMAP approved before Confirmation Review Meet schedule requirements

Projects/ Tasks:

Develop SSMAP
Develop surveillance plan
Reliability analyses
Software management
Workmanship standards and audits
Environmental verification support
On-orbit anomaly reporting
FAM / SAM support

Office of Systems Safety and Mission Assurance
NASA Goddard Space Flight Center
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Customer: GSFC Center Director

Activity Description: Corporate Knowledge Capture

The OSSMA is developing a comprehensive, linked system that will provide a widely accessible, user-friendly repository of the causes of failures and problems encountered in the development and operation of GSFC missions. This effort will be coordinated and integrated with similar efforts at the Aerospace Corporation, possibly other NASA centers, and other agencies within the aerospace industry.

Risk of Not Doing:

Failure to capture and analyze data relating to the failures of system hardware and software on NASA missions reduces our ability to learn from past mistakes, and improve the designs and test programs of future missions.

Products or Services:	**Metrics:**
P/FR system SOAR system PROCON system Lessons Learned Information System	TBD (New Initiative)
Projects/ Tasks: (TBD)	

Office of Systems Safety and Mission Assurance
NASA Goddard Space Flight Center
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Customer: GSFC Center Director

Activity Description: Training and Education

This activity provides the OSSMA workforce and other interested parties with the opportunity to improve their skills in the field of systems safety and mission assurance. This involves activities such as web-based education, training classes, rotational assignments, committee participation, conferences, and other opportunities that fulfill employee development goals.

Risk of Not Doing:

Lack of training results in a shortfall of project support personnel who are skilled in safety and mission assurance technologies.

Products or Services:	**Metrics:**
Training of OSSMA personnel Provision of training courses	Planned vs. actual training efforts (OSSMA goals are based on dedicating 10% of total man-hours on the combination of education, training and outreach)
Projects/ Tasks: Professional development initiative support OSSMA workshops Employee individual development plans	

Office of Systems Safety and Mission Assurance
NASA Goddard Space Flight Center
Annual Operating Agreement Plan

Customer: GSFC Center Director

Activity Description: Community Outreach

The objective of this activity is to share information and knowledge obtained from the performance of the OSSMA safety and mission assurance activities with the general public and in particular the GSFC community. A current activity is the use of the OSSMA training center by the Prince Georges Community College for after-hours courses in aerospace workmanship.

Risk of Not Doing:

Information valuable to others will not be communicated, which is one of the key goals of both the NASA Strategic Plan and the GSFC Strategic Implementation Plan.

Products or Services:	**Metrics:**
Community support	Planned vs. actual outreach efforts (OSSMA goals are based on dedicating 10% of total man-hours to the combination of education, training and outreach)
Projects/ Tasks: Mentor elementary, high school, and university students Judge science fairs Provide facilities and expertise in mission assurance activities to non-NASA personnel Speak on technology achievements to educational institutions and the general public Write and publish papers on technology developments in trade magazines and other technical publications	

Office of Systems Safety and Mission Assurance
NASA Goddard Space Flight Center
Annual Operating Agreement Plan

Customer: GSFC Center Director

Activity Description: Support to the establishment of the ISO 9001 Quality Management System

The OSSMA is managing the plan for Center certification to ISO 9001 by April of 1999. This project is in compliance to NMI 1270.3, which requires that all NASA centers be third party certified to one of the ISO 9000 standards.

Risk of Not Doing:
The risk of missed opportunities for improvement of GSFC quality management system procedures will increase if ISO 9000 certification is not pursued. The mandate of NMI 1270.3 will not be met.

Products or Services:	**Metrics:**
Project management	Scheduled plan vs. actual results
Projects/ Tasks: Development of Quality Management System structure Development of system level procedures Development of directorate work processes Development of work instructions Completion of first self-audit Completion of pre-certification audit Completion of certification audit	

Office of Systems Safety and Mission Assurance
NASA Goddard Space Flight Center
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Customer: GSFC Center Director

Activity Description: Anomaly Investigation

The OSSMA is developing the capability to perform anomaly investigations of significant problems or failures in GSFC missions. This process will be led by senior project and system management expertise assigned to the OSSMA on a rotational basis. This expertise will be drawn from Center projects as they are concluded. Supporting technical expertise will be drawn from GSFC technical directorates and/or other agency, government, or industry sources as needed. This effort will provide a structured, comprehensive approach to the anomaly review process.

Risk of Not Doing:
Failure to capture and analyze data relating to the failures of system hardware and software on NASA missions reduces our ability to learn from past mistakes, and to efficiently improve the designs and test programs of future missions.

Products or Services:	**Metrics:**
Anomaly investigation reports	TBD (New Initiative under development)
Projects/ Tasks:	
Anomaly investigation Anomaly diagnosis Anomaly resolution analysis (TBD)	

Office of Systems Safety and Mission Assurance
NASA Goddard Space Flight Center
Annual Operating Agreement Plan

Customer: NASA Headquarters Codes Q and AE

Activity Description: Policy Development Support

The OSSMA participates in Headquarters initiatives to develop and define Safety and Mission Assurance policy for the Agency. This participation includes attendance at the Quarterly SMA Directors meetings, and at the quarterly Engineering Management Council meetings. Documentation generation and reviews, and participation on special committees. The OSSMA is currently leading an agency-wide effort to supplement the current DCMC services with a more efficient surveillance assurance contract.

Risk of Not Doing:

Lack of participation by the OSSMA would mean that valuable perspectives from a key MTPE and Space Science Center would be lost.

Products or Services:	**Metrics:**
Participation in SMA quarterly meetings	Attendance at quarterly meeting
Response to Code Q and Code AE actions	Meets timely responses to action items

Projects/ Tasks:	
Policy development support	
Policy implementation support	
Supplier assurance contract development	

Office of Systems Safety and Mission Assurance
NASA Goddard Space Flight Center
Annual Operating Agreement Plan

Customer: NASA Headquarters Code Q

Activity Description: Technology Development

The OSSMA conducts and/or manages several separately funded technology development efforts that are expected to enhance the NASA implementation of safety and mission assurance in the future.

Risk of Not Doing:

The existing expertise at OSSMA would not be applied toward the efforts to improve the Agency S&MA implementation. This would limit NASA in the development of new approaches needed as space systems technology advances.

Products or Services:	**Metrics:**
NASA workmanship standards Workmanship training courses Goddard environmental verification specification System Safety Profile (SSP) Risk management course material	Cost and Schedule performance - actuals vs. plan
Projects/ Tasks: Course development in: Fiber optics, Polymerics, Hand Soldering Validation of Test-In-Air models with actual tests Measurement of vibro-acoustic levels imparted to spacecraft from launch vehicle Development of automated methods and tools for early phase system safety analysis Development and provision of risk management course	

Office of Systems Safety and Mission Assurance
NASA Goddard Space Flight Center
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Customer: GSFC Center Director

Activity Description: Support to Center Management Efforts

The OSSMA provides expertise to support Center management efforts. This includes service on the GSFC Program Management Council, the GSFC Quarterly Executive Dialog, and the Quarterly and Monthly Status Reviews. The OSSMA also supports or leads other GSFC management efforts as assigned by Center management.

Risk of Not Doing:

The Center would not take advantage of the experience that OSSMA managers have in the areas of system safety and mission assurance. This would make Center management decisions and judgements more difficult and subject to error.

Products or Services:	**Metrics:**
Attendance at reviews and meetings Special studies and reports as required	Attendance by OSSMA Director Timely completion and submission of report
Projects/ Tasks: PMC Reviews QED Reviews Quarterly Status Reviews Monthly Status Reviews Special assignments	

Appendix B

Contract Administration and Audit Services

FORECAST OF CAS QUALITY SUPPORT TO GSFC

FORECASTS ARE IN FULL-TIME EQUIVALENTS (FTE = 1695 HOURS) AND INCLUDE FUNCTIONS "I", "P" AND "Q"

GSFC NAS5-# (OR SUB/P.O.)	CONTRACTOR	PROJECT FAM/SAM	CAS	FY97 FORECAST	FY98 FORECAST	FY 99 FORECAST
S-27342F	LINCOLN LABS BOSTON, MA	EO-1 KELLY	ONR	0.1	0.1	0.1
S-92569D (NOAA)	PANAMETRICS WALTHAM, MA	SEM DANEY	DCMC	0.1	0.1	0.1
29370	BALL AEROSPACE BOULDER, CO	HST STICKA	DCMC	0.1	0	0
29500	LORAL PALO ALTO, CA	GOES HUBER	DCMC	5	3.5	2.5
29500 SUB SS-922800	ITT FT. WAYNE, IN	GOES HUBER	DCMC	1.5	1.5	0
29500 SUBS "VARIOUS"	MISCELLANEOUS SUBCONTRACTORS	GOES HUBER	DCMC	0.1	0.1	0.1
30008	BALL BOULDER, CO	HST STICKA	DCMC	0.1	0	0
30192	TRW REDONDO BEACH, CA	TDRS DAFNIS	DCMC	0	0	0
30350	LOCKHEED-MARTIN EAST WINDSOR, NJ	NOAA/TIROS DANEY	DCMC	4	4	4
30355	BALL BOULDER, CO	SBUV-2 DANEY	DCMC	0.1	0.1	0.1
30384	ITT FT. WAYNE, IN	NOAA/TIROS DANEY	DCMC	2.5	2.5	2.5
30503	LOCKHEED-MARTIN EAST WINDSOR, NJ	GGS ROBINSON	DCMC	0	0	0
30601	LOCKHEED-MARTIN PRINCETON, NJ	NOAA DANEY	DCMC	0	0	0
30722	MCDONNELL DOUGLAS HUNTINGTON BEACH, CA	OLS KOEHLER	DCMC	3	3	3
30800	SBRC GOLETA, CA	EOS AM ROBINSON	DCMC	1.3	1.3	1.3
30943	UNIV. OF MICHIGAN ANN ARBOR, MI	INMS KOLECKI	ONR	0.1	0.1	0
30945	UNIV. OF MICHIGAN ANN ARBOR, MI	GCMS KOLECKI	ONR	0.1	0	0
30955	UNIV. OF MICHIGAN ANN ARBOR, MI	GCMS KOLECKI	ONR	0	0	0
31000	ALLIED SIGNAL LAS CRUCES, NM	STGT/WSTGT MARVRAY	DCMC	0.85	0	0
31227	IDEAS COLUMBIA, MD	SSC COUNTS	DCMC	0.1	0.1	0.1
31289	UNIVERSITY OF ARIZONA TUCSON, AZ	HST STICKA	ONR	0	0	0
31443	TRW REDONDO BEACH, CA	2 PHASE FLOW GRINER	DCMC	0.1	0	0
31481	HERCULES MOGNA, UT	OLS KOEHLER	DCMC	0.3	0.3	0.3

FORECAST OF CAS QUALITY SUPPORT TO GSFC

FORECASTS ARE IN FULL-TIME EQUIVALENTS (FTE = 1695 HOURS) AND INCLUDE FUNCTIONS "I", "P" AND "Q"

GSFC NAS5-# (OR SUB/P.O.)	CONTRACTOR	PROJECT FAM/SAM	CAS	FY97 FORECAST	FY98 FORECAST	FY 99 FORECAST
31488	TRW REDONDO BEACH, CA	TOMS HUBER	DCMC	0	0	0
31729	IDEA BELTSVILLE, MD	SSC COUNTS	DCMC	0	0	0
31786	FAIRCHILD/OSC BELTSVILLE, MD	SSC COUNTS	DCMC	0.3	0.3	0.3
31977	HUGHES TORRANCE, CA	XTE/TRMM KELLY	DCMC	0	0	0
32017	IBM GAITHERSBURG, MD	HST STICKA	DCMC	0.1	0	0
32043	MOTOROLA CHANDLER, AZ	XTE/TRMM KELLY	DCMC	0	0	0
32044	SBRC SANTA BARBARA, CA	TRMM TOUTSI	DCMC	0	0	0
32314	AEROJET ELEC. SYS. DIV. AZUSA, CA	MSU-A EOS/POES DANEY	DCMC	2.4	2.4	2.4
32389	BECHDON UPPER MARLBORO, MD	SSC COUNTS	DCMC	0.3	0.3	0.3
32391	F&M WESTMINSTER, MD	SSC COUNTS	DCMC	0.2	0.2	0.1
32464	TRW REDONDO BEACH, CA	TRMM TOUTSI	DCMC	0	0	0
32467	ADCOLE MARLBOROUGH, MA	TRMM TOUTSI	DCMC	0	0	0
32468	UNIV. CORP. FOR ATM. RSCH BOULDER, CO	EOS/SOLSTICE TBD	DCMC	0.1	0.1	0.1
32500	LOCKHEED-MARTIN PRINCETON, NJ	EOS AM ELLIS	DCMC	4	3	0
32539	FAIRCHILD/OSC BELTSVILLE, MD	SSC COUNTS	DCMC	0.2	0.2	0.2
32542	LOCKHEED-MARTIN CAMDEN, NJ	METSAT DANEY	DCMC	0.5	0.5	0.5
32600	JACKSON & TULL BELTSVILLE, MD	SSC COUNTS	DCMC	0.7	0.7	0.7
32625	LORAL CONIC SAN DIEGO, CA	ACE CLAFFY	DCMC	0	0	0
32626	CALTECH PASADENA, CA	ACE INST. CLAFFY	ONR	0	0	0
32626 PO 859973	LITTON COLLEGE PARK, MD	ACE INST. CLAFFY	DCMC	0	0	0
32631	SBRC GOLETA, CA	LANDSAT VII BUCKNER	DCMC	0	0.2	0
32633	LOCKHEED-MARTIN VALLEY FORGE, PA	LANDSAT VII BUCKNER	DCMC	1.7	1.7	0
32650	SWALES BELTSVILLE, MD	SSC COUNTS	DCMC	0.5	0.5	0.5

FORECAST OF CAS QUALITY SUPPORT TO GSFC

FORECASTS ARE IN FULL-TIME EQUIVALENTS (FTE = 1695 HOURS) AND INCLUDE FUNCTIONS "I", "P" AND "Q"

GSFC NAS5-# (OR SUB/P.O.)	CONTRACTOR	PROJECT FAM/SAM	CAS	FY97 FORECAST	FY98 FORECAST	FY 99 FORECAST
32667	MCDONNELL DOUGLAS ST. LOUIS, MO	MOLA II KOLECKI	DCMC	0	0	0
32694 SUB	IDEAS COLUMBIA, MD	MOLA II KOLECKI	DCMC	0	0	0
32799	HUGHES DANBURY, CT	HST STICKA	DCMC	0.1	0.1	0.1
32864	BALL BOULDER, CO	HST STICKA	DCMC	1.3	1.3	1.3
32900	HUGHES EL SEGUNDO, CA	TDRS H/I/J DAFNIS	DCMC	1	1	1
32911	LOCKHEED-MARTIN CAMDEN, NJ	TIROS DANEY	DCMC	0.1	0.1	0.1
32921	ITT	AVHRR/HIRS DANEY	DCMC	0.2	0.2	0.2
32933	MCDONNELL DOUGLAS HUNTINGTON BEACH, CA	MELVS KOEHLER	DCMC	0.6	1	1
32940	CTA ROCKVILLE, MD	SSC COUNTS	DCMC	0.8	0.8	0.8
32954	TRW REDONDO BEACH, CA	EOS PM ROBINSON	DCMC	2	4	4
32989	UNIV. OF MICHIGAN ANN ARBOR, MI	PLANET B KOLECKI	ONR	0.1	0.1	0
38494	HUGHES DANBURY, CT	HST STICKA	DCMC	0	0	0
50000	LOCKHEED-MARTIN SUNNYVALE, CA	HST STICKA	DCMC	3	3.5	2.6
60000	HUGHES LANDOVER, MD	EOS DIS HAMMER	DCMC	1	1	1
NDPR-S-22643-F	JHU APL LAUREL, MD	ACE CLAFFY	NAV PRO	0.05	0	0
PO S-22643-F	BALL BOULDER, CO	ACE CLAFFY	DCMC	0	0	0
NDPR-S-22643-F	SAFT POITIERS, FRANCE	ACE CLAFFY	DCMC	0	0	0
NDPR-S-29767-F	JHU/APL LAUREL, MD	ACE/ULEIS CLAFFY	NAVY	0	0	0
NDPR-S-29767-F SUB	SEAKR TORRANCE, CA	ACE RECORDER CLAFFY	DCMC	0	0	0
NDPR-S-29767-F SUB	APPLIED SOLAR CITY OF INDUSTRY, CA	ACE CELLS CLAFFY	DCMC	0	0	0
RFP 5-74238/178	TRW LANHAM, MD	EDOS MARVRAY	DCMC	0	0	0
97046	UNIV. OF COLORADO BOULDER, CO	EOS/HRDLS PERISON	DCMC	0.1	0.2	0.3

FORECAST OF CAS QUALITY SUPPORT TO GSFC

FORECASTS ARE IN FULL-TIME EQUIVALENTS (FTE = 1695 HOURS) AND INCLUDE FUNCTIONS "I", "P" AND "Q"

GSFC NAS5-# (OR SUB/P.O.)	CONTRACTOR	PROJECT FAM/SAM	CAS	FY97 FORECAST	FY98 FORECAST	FY 99 FORECAST
LAMB S/C	UNKNOWN	LAMB KOLECKI	DCMC	0.1	0.1	0.2
LAMB INST	UNKNOWN	LAMB KOLECKI	DCMC	0.1	0.1	0.1
TRACE/WIRE	LAPR PALO ALTO, CA	SMEX COUNTS	DCMC	0	0	0
GOES NO/PQ S/C	UNKNOWN	GOES HUBER	DCMC	0	2	3
96090	ITT FT. WAYNE, IN	GOES HUBER	DCMC	3	3	3
97181	SXI	GOES HUBER	DCMC	0.6	1	1
GOES NO/PQ	MISC. SUBS	GOES HUBER	DCMC	0	0.2	0.2
96082	MOTOROLA	TRANSPONDER KELLY	DCMC	0.1	0.1	0.1
96083	CINCINNATI ELEC.	TRANSPONDER KELLY	DCMC	0.1	0.1	0.1
RFP5-59272-275	HARRIS	CODE 737 PHASED ARRAY ANTENNA KELLY	DCMC	0.1	0.1	0.1
30935	OSC POMONA,CA	TOMS HUBER	DCMC		0.1	0.1
97063	TECHSTAR	SMEX COUNTS	DCMC	0.2	0.2	0
96020	SOUTHWEST RESEARCH INST. SAN ANTONIO, TX	IMAGE INSTM'TS CLAFFY	DCMC	0.2	0.4	0.4
SwRI-83824 SUB TO 96020	LMMS SUNNYVALE, CA	IMAGE/SC CLAFFY	DCMC	0.2	0.4	0.4
97122	EAGLE PICHER COLORADO SPRINGS	IMAGE BATTERY CLAFFY	DCMC	0.1	0.3	0
TOTAL ONR/NAVY FTEs				0.45	0.3	0.1
TOTAL ONR/NAVY HRS				762.75	508.5	169.5
TOTAL DCMC FTEs				44.15	46.2	39.3
TOTAL DCMC HOURS				74834.25	78309	66613.5
TOTAL CAAS FTEs				44.6	46.5	39.4
TOTAL CAAS HOURS				75597	78817.5	66783

Appendix C

OSSMA Participation by GSFC Project

OSSMA Participation by GSFC Project

UPN	GSFC PROJECT CUSTOMERS	NASA ENTERPRISE CUSTOMERS	PROJECT PHASE	MISSION ASSURANCE SERVICES/PRODUCTS FY97	MISSION ASSURANCE RESOURCES/FTE		
				PARTICIPATION	FY98	FY99	FY00
218	**TDRS H,I,J**	**MTPE**	Design, Fabrication, Test	Requirements development, contract monitoring, Technical evaluations, Non-Conformance & Failure evaluation & resolution. Review of contractor safety documentation, assessment to project manager. Consultation and support for reliability engineering, environmental testing, and software.	4.3	3.7	3.5
225	**EOS AM-1**	**MTPE**	Design, Fabrication, Test	Requirements development, contract monitoring, Technical evaluations, Non-Conformance & Failure evaluation & resolution. Review of contractor safety documentation, assessment to project manager. Consultation and support for reliability engineering, environmental testing, and software.	10.6	1.7	7.0
226	**EOS PM-1**	**MTPE**	Design, Fabrication, Test	Requirements development, contract monitoring, Technical evaluations, Non-Conformance & Failure evaluation & resolution. Review of contractor safety documentation, assessment to project manager. Consultation and support for reliability engineering, environmental testing, and software.	10.6	8.6	6.6
227	**EOS LASER ALT (GLAS INSTR)**	**MTPE**	Design, Fabrication, Test	Requirements development, contract monitoring, Technical evaluations, Non-Conformance & Failure evaluation & resolution. Review of contractor safety documentation, assessment to project manager. Consultation and support for reliability engineering, environmental testing, and software.	2.7	3.3	4.3
228	**EOS CSF CHEM**	**MTPE**	Design, Fabrication, Test	Requirements development, contract monitoring, Technical evaluations, Non-Conformance & Failure evaluation & resolution. Review of contractor safety documentation, assessment to project manager. Consultation and support for reliability engineering, environmental testing, and software.	4.2	4.8	4.8
258	**EO-1**	**MTPE**	Design, Fabrication, Test	Requirements development, contract monitoring, Technical evaluations, Non-Conformance & Failure evaluation & resolution. Review of contractor safety documentation, assessment to project manager. Consultation and support for reliability engineering, environmental testing, and software.	4.9	2.3	0.0

OSSMA Participation by GSFC Project

UPN	GSFC PROJECT CUSTOMERS	NASA ENTERPRISE CUSTOMERS	PROJECT PHASE	MISSION ASSURANCE SERVICES/PRODUCTS FY97	MISSION ASSURANCE RESOURCES/FTE		
				PARTICIPATION	FY98	FY99	FY00
259	**ESSP**	**MTPE**	Design, Fabrication, Test	Requirements development, contract monitoring, Technical evaluations, Non-Conformance & Failure evaluation & resolution. Review of contractor safety documentation, assessment to project manager. Consultation and support for reliability engineering, environmental testing, and software.	1.1	1.3	1.1
419	**TOMS**	**MTPE**	EP / FM-3 Operations FM-5 Mfg, & Test	Mission launched EP/FM-3 Minimal on-orbit support FM-5 Mfg and test verification (for interface to Russion Meteor).	0.5	0.6	0.5
428	**EOSDIS/EDOS**	**MTPE**	Design, Devlopment, Test	Consultation and support for reliability engineering, environmental testing, and software.	2.7	2.6	2.6
437	**TRMM**	**MTPE**	Launch	Launch / Safety Processing. Full Safety System program implementation, consultation and support for reliability engineering, environmental testing, and software. Consultation and support for reliability engineering, environmental testing, and software.	0.7	0	0.0
634	**LANDSAT**	**MTPE**	Development Fabrication, Test	Review of contractor safety documentation, launch range presentation, and mission safety certification. Consultation and support for reliability engineering, environmental testing, and software.	7.5	0	0.0
409	**IDIQ SEB SUPPORT**	**MTPE / Space Science**	Contract Evaluation	SEB Participation. Consultation and support for reliability engineering, environmental testing, and software.	0.1	0	0.0
615	**POES**	**MTPE, & NOAA**	4 satellites in operation, 5 satellites in production, various mods in development	Participation in failure review board for operational satellites. In-plant monitoring and surveillance of production. Review of new designs. Review of contractor safety documentation, launch range presentation, and mission safety certification. Consultation and support for reliability engineering, environmental testing, and software.	20.4	16.4	10.0

OSSMA Participation by GSFC Project

UPN	GSFC PROJECT CUSTOMERS	NASA ENTERPRISE CUSTOMERS	PROJECT PHASE	MISSION ASSURANCE SERVICES/PRODUCTS FY97	MISSION ASSURANCE RESOURCES/FTE		
				PARTICIPATION	FY98	FY99	FY00
616	**GOES**	**MTPE, & NOAA**	8/9/10 - Operations L/M - Mfg & Test, N & Q - Phase CD	8/9/10 - Participation in ground operations systems. L & M- mfg. & test verification. N & Q - MA support to RFP & review of proposals. Review of contractor safety documentation, launch range presentation, and mission safety certification. Consultation and support for reliability engineering, environmental testing, and software.	24.7	25.6	26.8
211	**ACE**	**Space Science**	Launch	Full Safety System program implementation. Consultation and support for reliability engineering, environmental testing, and software.	0.0	0.0	0.0
265	**FUSE**	**Space Science**	Design, Fabrication, Test	Requirements development, contract monitoring, Technical evaluations, Non-Conformance & Failure evaluation and resolution. Consultation and support for reliability engineering, environmental testing, and software.	0.6	0	0.0
287	**MAP / IMAGE / LENA**	**Space Science**	Design, Fabrication, Test	Requirements development, contract monitoring, Technical evaluations, Non-Conformance & Failure evaluation & resolution. MAP-full safety program implementation IMAGE-mission contractor safety support LENA-instrument level safety data development. Consultation and support for reliability engineering, environmental testing, and software.	12.6	9.9	4.2
399	**SXG PROGRAM**	**Space Science**	Development	Requirements Development. Consultation and support for reliability engineering, environmental testing, and software.	0.1	0.1	0.0
430	**EQUATOR-S**	**Space Science**	Design	Consultation and support for reliability engineering, environmental testing, and software.	0.1	0.1	0.0
440	**INTERNATIONAL PROJECTS**	**Space Science**	All phases	Varied safety system support, from partial through full safety system development. Consultation and support for reliability engineering, environmental testing, and software.	2.3	0.3	0.0
689	**MIDEX/UNEX**	**Space Science**		Full reliability engineering risk management implementation.	0.1	3.5	5.2

OSSMA Participation by GSFC Project

UPN	GSFC PROJECT CUSTOMERS	NASA ENTERPRISE CUSTOMERS	PROJECT PHASE	MISSION ASSURANCE SERVICES/PRODUCTS FY97	MISSION ASSURANCE RESOURCES/FTE		
				PARTICIPATION	FY98	FY99	FY00
628	**CASSINI - CIRS**	**Space Science**		Instrument level safety data package development. Consultation and support for reliability engineering, environmental testing, and software.	0	0	0.0
6286702	**CASSINI INMS./GCMS**	**Space Science**		Instrument level safety data package development. Consultation and support for reliability engineering, environmental testing, and software.	0	0	0.0
854	**SPARTAN**	**Space Science**	All phases	Full Safety System program implementation, consultation and support for reliability engineering, environmental testing, and software.	0.5	0	0.0
879	**SPARTAN STUDIES**	**Space Science**	All phases		0.7	1.6	1.4
864	**SMEX**	**Space Science**	All phases	Full Safety System program implementation, consultation and support for reliability engineering, environmental testing, and software.	4.2	0.2	0.1
926	**HITCHHIKER/ SPARTAN**	**Space Science**	All phases	Full Safety System program implementation, consultation and support for reliability engineering, environmental testing, and software.	11.3	9.1	9.1
953	**SPARTAN 208**	**Space Science**		Full Safety System program implementation, consultation and support for reliability engineering, environmental testing, and software.	1	1	0.3
262	**OLS**		Fabrication, Delivery, Launch	Launch Services, Safety compliance on launch vehicle service contractors, oversight of payload safety. Consultation and support for reliability engineering, environmental testing, and software.	8.6	9.8	9.9
458	**HST PROJECT**		Service, Development	Full Safety System program implementation, consultation and support for reliability engineering, environmental testing, and software.	33.6	32.8	33.9

OSSMA Participation by GSFC Project

UPN	GSFC PROJECT CUSTOMERS	NASA ENTERPRISE CUSTOMERS	PROJECT PHASE	MISSION ASSURANCE SERVICES/PRODUCTS FY97	MISSION ASSURANCE RESOURCES/FTE		
				PARTICIPATION	FY98	FY99	FY00
465	**SAC-C PROJECT**		Development	Full Safety System program implementation, consultation and support for reliability engineering, environmental testing, and software.	0.4	0.4	0.0
566	**NOAA/TITAN**			Safety compliance on launch vehicle service contractors, oversight of payload safety. Consultation and support for reliability engineering, environmental testing, and software.	0.3	0.2	0.2
881	**UNEX**			Consultation and support for reliability engineering, environmental testing, and software.	0.1	0.1	0.0
344	**CODE 600 RTOPS**			Consultation and support for reliability engineering, environmental testing, and software.	0.5	0	0.0
370	**PHOENIX**			Consultation and support for reliability engineering, environmental testing, and software.	0.4	0.4	0.0
839	**SIRTF/IRAC/GLAST**			Varied safety system support, from partial through full safety system development. Consultation and support for reliability engineering, environmental testing, and software.	3.4	4.5	2.5
MANPOWER TOTALS in FULL TIME EQUIVALENTS					**216**	**182**	**171**

Appendix D

Code Q Funded Programs

UPN 323 Cost Plan

UPN #	Owner	Org.	Task Objective	Funding Requested ($K)		
				FY98	**FY99**	**FY00**
323-01	Pearson	303	To prepare a plan for use by all GSFC organizations to implement software configuration management to meet the requirements of ISO 9000.	135.0	33.8	0.0
323-08-01	Pajerski	550	To develop a course on software process improvement program management.	120.0	0.0	0.0
323-08-05	Hyatt	302	To update the Software Engineering Management "Risk Management" course.	132.0	0.0	0.0
323-08-04	Pajerski	550	To develop adaptability evaluation criteria for process models and procedures.	150.0	30.0	0.0
323-46	Hyatt	302	To provide tools to support the identification of system areas where system safety analytical methods and techniques should be focused.	65.0	75.0	0.0
323-48-02	Maristch	303	Establish a performance evaluation system for products and services, for GSFC and suppliers, which includes the requirements of ISO 9001, The Concept of Risk as a Resource, Performance Based Contracting, The Advanced Quality Systems, and the PDI.	407.2	407.2	0.0
323-48-01	Pearson	303	To expand the existing GSFC procedure to provide the ability to assess mission risk based on software lifecycle and tailoring of the mission software requirements and the ability to do inline software assessment of a mission as it proceeds.	62.5	0	0
323-49-01	Cummings	312	The purpose of this effort is to maintain NASA's workmanship standards, add new standards as required, and to merge the NASA standards into commercial requirements where applicable.	150.0	100.0	100.0
323-49-03	Waterbury	310	To enable quick identification of potential reliability problems by value-added processing of Alert data and the maintenance of that data in a high-quality, easily accessible format which can be cross-referenced to NASA project parts lists.	50.0	150.0	150.0
323-49-04	Blackwood	313	To maintain and enhance the FRED on-line database mgmt. system. Prototype processes leading to one NASA experience information database system.	370.0	370.0	370.0
323-72	Milne	302	To develop engineering and management tools to provide guidance in the development, implementation and tailoring of test programs, and to develop new, improved, and more cost effective testing techniques.	655.0	650.0	0.0

UPN 323 Cost Plan

UPN #	Owner	Org.	Task Objective	Funding Requested ($K)		
				FY98	**FY99**	**FY00**
323-73	Remez	302	In a joint endeavor with JPL, to develop and implement “smart” processes that will assist in optimizing Mission Assurance programs for all flight hardware types and combinations based on flight and ground experiences, .	250.0	150.0	150.0
323-74	Maristch	303	To develop 1.tools to measure true cost of S&MA, and 2.ways of identifying and mitigating risk. To document historical mission approaches for lessons learned.	150.0	150.0	0.0
323-78	Chern	313	To develop procedures and documentation for use of the SLAM in non-destructive evaluation of more complex electronic components.	125.0	155.0	0.0
323-79	Shaw	312	New technology validation, assessment and information dissemination for EEE, Advanced Interconnect, and Radiation Effects technologies.	1,650.0	1,650.0	1,885.0
323-93-01	Pearson	303	To develop a software quality assurance training course.	135.0	0.0	0.0
323-93-02	Maristch	303	To develop courses in fastener technology and usage of the NASA Alert database.	60.0	0.0	0.0
323-93-03	Maristch	303	Perform Subject Matter Expert related activities for GSFC, for all PDI modules developed during FY97 and FY98	45.0	36.0	36.0
323-93-04	Remez	302	To develop a web-based course for Chapter 2 of the new NASA Reliability, Availability and Maintainabilitiy (RAM) Technical Standard.	60.0	0.0	0.0
323-95-01	Maristch	303	Assurance Functions for NASA Contracts” to a NASA Procedures and Guidelines document.	40.0	0.0	0.0
323-95-02	Maristch	303	To establish and implement a process that creates and updates a common database to ensure that NASA SRM & QA acronyms and definitions are identified and kept current.	40.0	0.0	0.0
			TOTAL UPN 323	**4,851.7**	**3,957.0**	**2,691.0**